

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 4, 2008 has been entered.

Election/Restrictions

2. Claims 9-11 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on October 31, 2006.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1, 6-8 and 12-15 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Claim 1 recites that one end of the channel is narrowed substantially only by two rotatable bodies to form a discharge portion, which is NEW MATTER. Nowhere in the original specification is this “substantially only” language found. Further, this “substantially only” language cannot be clearly understood. On one extreme, you have “only”, wherein one end of the channel is narrowed only by the two rotatable bodies. On the other extreme, other elements besides the two rotatable bodies narrow one end of the channel. So, how is “substantially only” related to the extremes? If you have a few other elements besides the two rotatable bodies narrowing the one end, don't you still just have other elements besides the two rotatable bodies narrowing the one end, which is the other extreme? What number range of few other elements are encompassed by “substantially”? Further, this “substantially only” language is a negative limitation or exclusionary proviso. Any negative limitation or exclusionary proviso must have basis in the original disclosure, Ex parte Grasselli, 231 USPQ 393.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 99/65666.

WO 99/65666 discloses a foam forming die comprising: an inlet 2 for inserting a molten resin containing a foaming agent from an extruder, a hollow portion formed so as

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to permit the molten resin inserted to spread in the widthwise direction (i.e., fig. 2), and a channel (i.e., tapered channel; fig. 1) for discharging the molten resin that has passed through the hollow portion and is spread in the widthwise direction (i.e., figs. 1 and 2), wherein one end of the (tapered) channel is narrowed substantially only by two rotatable bodies 3 to form a discharge portion (i.e., fig. 1), the two rotatable bodies having an outer periphery substantially in the form of a true circle in cross section and being disposed in parallel with their axes extending in the widthwise direction (i.e., figs. 2), and the discharge portion for discharging the molten resin being formed by a gap between the rotatable bodies, and the downstream side of the discharge portion is configured in such a manner that when the molten resin discharged from the discharge portion is released, the pressure is reduced, resulting in expansion of the molten resin (i.e., fig. 1), and the two rotatable bodies 3, whose temperatures can be controlled by a temperature regulator 7, can rotate in the molten resin discharging direction (i.e., fig. 1). However, WO 99/65666 does not disclose the dimensional requirements of instant claim 1.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the die of WO 99/65666 to have the dimensional requirements of instant claim 1 because where the only difference between the prior art and the claims is a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device is not patentably distinct from the prior art device, In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984).

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7. Claims 1, 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mendel (US 5,401,454).

Mendel (US 5,401,454) discloses a foam (i.e., col. 4, lines 54-57) forming die comprising: an inlet 36 for inserting a molten resin containing a foaming agent from an extruder, a hollow portion 37 formed so as to permit the molten resin inserted to spread in the widthwise direction, and a channel (defined by elements 39, 40, 42, 43) for discharging the molten resin that has passed through the hollow portion and is spread in the widthwise direction, wherein one end of the channel is narrowed substantially only by two rotatable bodies 63, 64 to form a discharge portion, the two rotatable bodies 63, 64 having an outer periphery substantially in the form of a true circle in cross section and being disposed in parallel with their axes extending in the widthwise direction (i.e., figs. 1 and 2), and the discharge portion for discharging the molten resin being formed by a gap between the rotatable bodies 63, 64, and the downstream side of the discharge portion is configured in such a manner that when the molten resin discharged from the discharge portion is released, the pressure is reduced, resulting in expansion of the molten resin (i.e., fig. 2), and the two rotatable bodies 63, 64, whose temperatures can be controlled by a temperature regulator (i.e., col. 5, lines 29-33), can rotate in the molten resin discharging direction (i.e., fig. 2), a rotation adjusting means for increasing or decreasing the speed of rotation or torque of the rotatable body bodies, (i.e., col. 5, lines 11-25; "single point adjustment"), wherein the rotatable bodies are provided with projections extending from an outer peripheral surface thereof diametrically outward over the entire width (i.e., fig. 16), a forming device (i.e., figs. 2,

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11) for forming a foam-formed article discharged from the discharge portion into a predetermined shape at the downstream side of the discharge portion wherein the forming device comprises a channel through which the molten resin discharged from the discharge portion passes, the channel being higher than the discharge portion (i.e., col. 4, lines 38-53; col. 6, lines 40-49), wherein the forming device comprises a pair of plate-like forming members 45, 46 and the channel being formed between the two forming members (fig. 2), and wherein the forming device is provided with a pair of roller units 130, 131 and the channel being formed between the two roller units (fig. 11). However, Mendel (US 5,401,454) does not disclose the dimensional requirements of instant claim 1.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the die of Mendel (US 5,401,454) to have the dimensional requirements of instant claim 1 because where the only difference between the prior art and the claims is a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device is not patentably distinct from the prior art device, In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984).

8. Claims 8, 12, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mendel (US 5,401,454) in view of Phipps (US 4,364,722).

Mendel (US 5,401,454) is applied as above. However, Mendel does not disclose the dimensional requirements of instant claim 1, or the temperature regulator means of the forming members.

Phipps (US 4,364,722) discloses a die including a forming device composed of plate members 14, the plate members 14 composed of a heat cooling jacket 84 in which a heat cooling medium circulates.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the forming device of Mendel (US 5,401,454) with the forming device of Phipps (US 4,364,722) because Mendel (US 5,401,454: col. 4, lines 33-38) explicitly discloses that further construction of the forming device is disclosed by Phipps (US 4,364,722); and to modify the die of Mendel (US 5,401,454) to have the dimensional requirements of instant claim 1 because where the only difference between the prior art and the claims is a recitation of relative dimensions of the claimed device and a device having the claimed relative dimensions would not perform differently than the prior art device, the claimed device is not patentably distinct from the prior art device, In Gardner v. TEC Systems, Inc., 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984).

9. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Mendel (US 5,401,454) in view of Phipps (US 4,364,722) as applied to claims 8, 12, 13 and 15 above, and further in view of Kitayama et al. (US 6,520,759).

Kitayama et al. (US 6,520,759) discloses a die including a forming device composed of plate members, wherein a contact surface of the plate members defining

the channel is coated with a fluororesin to make sliding of the extruded product smoother to prevent scarring thereof (i.e., col. 9, line 58, to col. 10, line 39).

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to modify the forming device of Mendel (US 5,401,454) with fluororesin coating because such a modification is well known and conventional in the art as disclosed by Kitayama et al. (US 6,520,759) and would make sliding of the extruded product smoother to prevent scarring thereof.

Response to Arguments

10. Applicant's arguments with respect to the instant claims have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues that WO '666 does not teach that one end of the channel is narrowed substantially only by two rotatable bodies to form a discharge portion. Referring to Figure 1, WO '666 discloses that the end of the channel of WO '666 is tapered where the height of the channel gradually decreases before the fluid enters rotatable bodies (3). Figure 1 of WO '666 shows that the tip of the channel is almost the same height as the minimum gap between the pair of rollers (3). That is, in WO '666, one end of the channel is not narrowed substantially only by the two rotatable bodies (3) to form a discharge portion. In contrast, in the claimed invention, one end of the channel is narrowed substantially only by two rotatable bodies to form a discharge portion.

The examiner respectfully disagrees. WO '666 does show in fig. 1 a tapered channel. However, fig. 1 also shows that this channel is narrowed substantially only by two rotatable bodies 3 to form a discharge portion. In other words, the cross sectional

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dimension of the tapered channel is narrowed substantially only by two rotatable bodies 3 to form a discharge portion. Note that the claim limitations for “channel” do NOT negate tapered channels. Further, even if the tapering is considered to be a narrowing element, then the narrowing of the end of the channel is only by the tapering and the two rotatable bodies, which reads on “substantially only” of instant claim 1.

Furthermore, claim 1 requires one end of the channel (not the entire channel) is narrowed substantially only by two rotatable bodies to form a discharge portion. Fig. 1 of WO '666 clearly shows **one end** of the channel being narrowed substantially only by two rotatable bodies to form a discharge portion.

Applicant argues that Mendel does not teach that one end of the channel is narrowed substantially only by two rotatable bodies to form a discharge portion. The Examiner indicates that in the die of Mendel, one end of the channel is narrowed by two cylindrical bars (63, 64) to form a discharge portion. Applicant respectfully disagrees. Referring to Figure 2, Mendel discloses that the discharge portion of the die is formed by a gap between an upper die lip (45) and a lower die lip (46). See the narrowed channel (gap) after the resin passes an upper adjustment (55) shown in Figure 2. That is, the cylindrical bars (63, 64) are located halfway along the channel and the gap between them does not form the discharge portion. Furthermore, in Mendel, since the upper and lower die lips (45, 46) narrow the end of the channel, one end of the channel is not narrowed substantially only by the cylindrical bars (63, 64). In contrast, in the claimed invention, one end of the channel is narrowed substantially only by two rotatable bodies to form a discharge portion. See, for example, Figure 2 of this

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application. In view of the above, Applicant respectfully submits that Mendel does not teach the above-indicated feature of the claimed invention.

The examiner respectfully disagrees. It should be noted that the apparatus of Mendel is similar to the apparatus shown in fig. 10 of the instant application. By following applicants logic applied to Mendel above, in instant fig. 10, the discharge portion of the die is formed by a gap between the forming members 53. However, this would be contrary to the ACTUAL disclosure of the instant specification which discloses that element 9 in fig. 10 is the discharge portion. As explicitly recited by the instant claims, the discharge is formed by a gap between the rotatable bodies. Such a gap between rotatable bodies 63, 64 is CLEARLY shown in fig. 2 of Mendel, and thus Mendel discloses a discharge portion as required by the instant claims. Fig. 2 of Mendel further shows one end of a channel being narrowed substantially only by the two rotatable bodies 63, 64 to form the discharge portion.

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Applicant argues that that there is no reason or motivation to modify WO '666 so as to have a similar form to that of the claimed invention. In one embodiment of the claimed invention, in order to inhibit the generation of shear heat in the molten resin for the precise control of the resin temperature, the discharge portion for discharging the

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molten resin is formed by the two rotatable bodies. In contrast, in the die of WO '666, the rollers (3) are not designed to prevent the generation of shear heat during the discharge of the molten resin. The pair of rollers (3) with a central channel (7) into which a coolant is introduced is provided in the die of WO '666, because the outer layers of the molten resin are formed at an early stage by cooling so as to prevent the leakage of a blowing agent in the molten resin, and the formed outer layers are discharged without damage. That is, the point of the die of WO '666 is to form the outer layers of the molten resin at an early stage. If the channel of the die of the prior art reference is narrowed substantially only by the rollers as in the claimed invention, the molten resin is cooled in contact with the rollers in region "A" (see the Reference Figure at the next page) to form outer layers. The formed outer layers are carried to the minimum gap portion between the rollers (3) by the rotation of the rollers (3), causing clogging of the minimum gap with the formed outer layers. In view of the above, Applicant respectfully submits that there is no reason or motivation to modify WO '666 so as to arrive at the claimed invention.

The examiner respectfully disagrees. These arguments are not commensurate in scope with the instant claims. The instant claims do NOT require inhibiting the generation of shear heat in the molten resin for the precise control of the resin temperature. Further, WO '666 reads on the "substantially only" limitations of the instant claims, as mentioned above.

Applicant argues that there is no reason or motivation to modify either WO '666 or Mendel to have the claimed relationship wherein the relationship between the height

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T of the channel and the smallest gap t between the two rotatable bodies satisfies $T > 2t$, and the relationship between the radius R of at least one rotatable body and the smallest gap t satisfies $R > 15t$ because WO '666 and Mendel obtain their intended purposes without considering the above specific numerical relationship between the channel and the two rotatable bodies.

The examiner respectfully disagrees. Clearly, when the apparatus of WO '666 and Mendel are built, there must be some actual dimensions. And it would be well within an artisan of ordinary skill that there can be a range of operable dimensions as long as the apparatus operates as intended and disclosed by WO '666 and Mendel.

Applicant argues that, in one embodiment, the above-recited specific numerical range provides the benefit that an effective channel length is appropriately lengthened, thereby applying a sufficient pressure to the molten resin, and the internal pressure of the die can be maintained at a suitable pressure, for example, 10kg/cm². See the specification at page 29, lines 13-17.

However, these arguments are not commensurate in scope with the instant claims. The instant claims do NOT require such limitations. Furthermore, the apparatus of WO '666 and Mendel also inherently have an effective channel length applying sufficient pressure to the molten resin. In other words, there is no difference in operation from the apparatus of the prior art.

Applicant argues that claim 8 recites a forming device in which the channel height of the forming device is higher than that of discharge portion. In one embodiment of the claimed invention, by providing the forming device as described above, the

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molten resin in a softened state is securely formed and cooled to some extent, and the formed and cooled molten resin is then taken up by a take-up unit. One embodiment of the claimed invention can provide the following advantages. The foam-formed article discharged from the foam-forming die is not always formed into a final product that has a cross-sectional shape similar to the shape of the discharge portion. For example, the cross-sectional shape of the discharged resin may sometimes be wavelike. The forming device allows the foam-formed article to be formed into a desired cross-sectional shape.

However, these arguments are not commensurate in scope with the instant claims. The instant claims do NOT require such limitations.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOSEPH LEYSON whose telephone number is (571)272-5061. The examiner can normally be reached on M-F 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gupta Yogendra can be reached on (571) 272-1316. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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